PAVEMENT PERFORMANCE DATA ANALYSIS FORUM

Sponsored by the TRB Data Analysis Working Group
Hans J. Ertman Larsen, Chairman
A. Robert Raab, TRB Senior Program Officer

January 10. 2004
Blue Room, Omni Shoreham Hotel, Washington, DC

0900-0930am   Call to Order
                         Chairman's Welcome
                         Staff Report

0930-1000am   **INTERPRETATION OF TRANSVERSE PROFILES TO DETERMINE THE SOURCE OF RUTTING WITHIN ASPHALT PAVEMENT SYSTEM**
Claude Villiers and Reynaldo Roque
University of Florida, Gainesville, Florida, USA

1000-1015am   Presenters' Questions and General Discussion

1015-1030am   Morning Break

1030-1100am   **LTPP AND APT – WILL THEY EVER MATCH?**
Fridtjof Thomas[1] and Arzu Onar[2]
[1]Swedish National Road and Transport Research Institute, Borlange, Sweden
[2]University of Miami, Coral Gables, Florida, USA

1100-1115am   Presenters' Questions and General Discussion

1115-1145am   **TRAFFIC CHARACTERIZATION FOR MECHANISTIC PAVEMENT DESIGN**
Jorge A Prozzi
University of Texas, Austin Texas, USA

1145-1200noon   Presenter's Questions and General Discussion

1200-0130pm   Mid-Day Break

0130-0200pm   **VALIDATION AND IMPLEMENTATION OF A SELF-ITERATIVE SOFTWARE FOR 3D-FE DYNAMIC ANALYSIS OF FWD HISTORY DATA AND BACKCALCULATION OF PAVEMENT MODULUS VALUE**
Kunihito Matsui. Tokyo Denki University, Japan

0200-0215pm   Presenter's Questions and General Discussion

0215-0245pm	**A REVIEW OF DISTRESS DATA IN THE LTPP DATABASE**
	David Jones
	Transportation Research Board, Washington, District of Columbia, USA

| 0245-0300pm | Presenter's Questions and General Discussion |

0300-0330pm	**DISTRESS IDENTIFICATION AND ANALYSIS FOR THE FHWA-NPS ROAD INVENTORY PROGRAM**
	James Kennedy[1] and Olga I. Selezneva[2]
	[1]Federal Highway Administration, Lakewood, Colorado, USA
	[2]ERES Consultants - Division of ARA Inc., Columbia, Maryland, USA

| 0330-0345pm | Presenters' Questions and General Discussion |

| 0345-0400pm | Afternoon Break |

0400-0430pm	**FORWARDCALCULATION TECHNIQUES & RESULTS**
	Richard N. Stubstad and Erland O. Lukanen
	ARA, Inc.– ERES Consultants Division, Ventura, California, USA

| 0430-0445pm | Presenter's Questions and General Discussion |

| 0445-0515pm | **FEASIBILITY USING STEREOVISION FOR PAVEMENT CONDITION SURVEY** |
| | Kelvin Wang, University of Arkansas, Fayetteville, Arkansas, USA |

| 0515-0530pm | Presenter's Questions and General Discussion |

| 0530-0600pm | Steering Committee Session |

| 0600pm | Close of Meeting |

A NOTE ABOUT THE DAWG

The DAWG is an international forum for the discussion of methods of analysis of pavement performance data. Presentations at DAWG-sponsored forums address the technical interests of professionals engaged in highway research and engineering design, maintenance, and rehabilitation who are engaged in collecting, processing, and analyzing such data and developing insights into the behavior of pavements. Presentations offered by forum attendees (by prior arrangement) focus on work-in-progress concerning the development of techniques for extracting and analyzing data, and early results of recent applications of these techniques. Topics such as model building, sensitivity analysis, and development of transfer functions linking structural response to distress are especially popular and welcome.

A DAWG-sponsored forum has a minimum of formality to encourage open discussion among attendees and minimize the time between the presenters' preparation and dissemination of analytical results. The agenda is prepared in advance, based on responses to a call for abstracts. Abstracts are reviewed solely for conformity with DAWG guidelines, and as many as time permits are placed on the agenda. Presentations are not subjected to prior technical review. Copies of presentation materials are not distributed. Presentations are not published. Comments by forum attendees are not recorded.

DAWG-sponsored forums are held twice each year: immediately preceding the TRB Annual Meeting in Washington DC in January, and approximately at the midyear at another location. The midyear meeting is usually held in conjunction with a major highway pavement conference where it is expected that many attendees will also be interested in participating in a DAWG forum. If requested by the organizers, the DAWG will arrange and conduct a formal paper session conforming to all the policies and procedures of the conference.

As a TRB committee, the DAWG has appointed members who serve as a steering committee to guide the planning of future meetings. However, DAWG forums are open to everyone interested in the subjects to be discussed, and all attendees enjoy equal status. There is no registration requirement or fee required to attend meetings, but advance notice of the intent to attend a particular forum is recommended and appreciated.

Inquiries are welcome from those interested in adding their names to the DAWG's mailing list, and those wishing to submit abstracts of presentations for consideration for presentation at a particular forum. Inquiries and abstracts should be directed to:

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PRESENTATION ABSTRACT FORM

Pavement Performance Data Analysis Forum

TRB Data Analysis Working Group

TITLE OF PRESENTATION:

ABSTRACT:

PRESENTER'S QUESTIONS: I would like to receive comments, suggestions, and feedback from the meeting's attendees on the following matters:

1-

2-

3-

PRESENTER'S STATEMENT: This work is still in progress, and has not been submitted for presentation or publication at another meeting.

Name:
Title and Organizational Affiliation:
Mailing Address:
Telephone/Fax/Email:

GUIDELINES FOR PREPARATION OF ABSTRACTS AND BRIEFINGS
FOR PRESENTATION AT PAVEMENT PERFORMANCE DATA ANALYSIS FORUMS
SPONSORED BY TRB'S DATA ANALYSIS WORKING GROUP (DAWG)

1. Presentations at DAWG Forums are selected through the review and evaluation of completed abstract forms submitted in response to calls for abstracts.

2. Only abstracts describing work in progress will be accepted for presentation. Completed work that has been submitted for presentation or publication elsewhere will not be accepted.

3. Presentations should focus on techniques for collecting, processing, and analyzing pavement performance databases, as well as preliminary results of applications of these techniques.

4. In addition to submitting an abstract of the proposed presentation, the presenter must complete the abstract form by also supplying a set of questions for attendees' discussion and response during the Forum. These questions should address issues being considered or confronted by the presenter in the further development of his/her project.

5. The technical quality of the abstract and the questions will be evaluated separately, and will have equal value in the determination of appropriateness of the submission for presentation.

6. The presenter will have 30 minutes for presentation of material (including interruptions by attendees seeking clarification) and an additional 15 minutes for a dialog with attendees concerning the Questions provided.

7. It is recommended that the presenter prepare a 20-minute presentation consisting of approximately 10-15 slides. It is unlikely that the presenter will be able to present a higher number of slides in the time allotted.

8. Time will be monitored closely. The presenter will be advised when his/her time is exhausted.

INTERPRETATION OF TRANSVERSE PROFILES TO DETERMINE THE SOURCE OF RUTTING WITHIN ASPHALT PAVEMENT SYSTEM

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ABSTRACT

Permanent deformation, commonly referred to as "rutting", is a major failure mode for asphalt pavements. It is caused by repeated loads on the asphalt pavement and may be visible in the wheel paths of the roadway. The transverse profilograph has been recognized as one of the most accurate devices to measure rut depth. However, interpretation of surface transverse profile measurements poses a major challenge in determining the contribution of the different layers to rutting.

The primary objectives of this study were the following:
1.   To interpret the rut profile as measured by the transverse profilograph
2.   To develop an approach to identify the most likely source of rutting

Rut measurements were obtained using a 3.6-meter (12-foot) transverse profilograph on eight different sites that were part of a pavement performance-monitoring project. Six of the sections evaluated were on interstates and two were on state highways. Measurements were taken at about one year, two years, and four years after construction. In addition, 150-millimeter (6-inch) diameter cores were taken from the asphalt pavement in both the wheel paths and between the wheel paths each time the transverse profile measurements were taken.

An approach was developed to evaluate the contributions of different layers on rutting and the presence (or absence) of instability within the Hot Mix Asphalt (HMA) layer. The approach utilizes information commonly obtained from cores and Falling Weight Deflectometer (FWD) data. The method was based on the following process of elimination:
1. Determine the contributions of rutting due to asphalt layer compaction (if possible). Compare the change in height due to significant reduction in air voids to the average rut depth.
2. Determine if rutting was due to compaction of the subgrade layer. Use layer moduli obtained from FWD data to determine the shape of the vertical subgrade strain distribution, which can be used to predict the shape of the transverse profile if rutting had only been caused by the subgrade.
3. Examine the effect of base compaction to rutting. Evaluate the base modulus from backcalculation and determine if the cause of rutting might be attributable to a weak base. If enough evidence shows this may be the case, compare the surface profile to the possible deflection that would result from base compaction.
4. Determine and evaluate the presence of instability or dilation in the surface layer.

An approach was developed and tested on the transverse profile measurements obtained from the eight sites. The following conclusions were made
1. A single rut measurement can be misleading relative to the performance of a particular mixture.

2. Absolute rutting cannot be used as a measure of mixture performance. One must evaluate each section carefully to assess the contribution of different layers.
3. Continued instability may not result in an increase in rut depth because the rutted basin broadens as traffic wander compacts or moves the dilated portion of the mixture.
4. The approach developed appears to provide a reasonable way to distinguish between different sources of rutting.

PRESENTERS' QUESTIONS: The authors would like to receive comments, suggestions, and feedback from the meeting's attendees on the following issues:
1. This technique is based on linear elastic model. Have similar approaches been developed? If yes, are there any drawbacks. Are there suggestions for modification or improvements to the proposed procedures?
2. In this model, rutting associated to air void compaction is only based on core data. Will core data be available at all times? Should we focus on a different approach to determine the effect of air void compaction? If yes, are there any suggestions?
3. This technique did not account for rut depth associated with the friction course. Would it be appropriate to assume a percent of the rut depth to the friction course? In your state, what is a typical percentage of rutting associates to friction course layer compaction?
4. What is a typical rut depth associated to compaction of the subgrade layer for your state?
5. Can anyone share any data on surface rut depth in which transverse profile (or equivalent) was used along with core data and trench information?

PRESENTERS' STATEMENT: This work is still in progress, and has not been submitted for presentation or publication at another meeting.

LTPP AND APT – WILL THEY EVER MATCH?

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ABSTRACT

The Long Term Pavement Performance (LTPP) projects around the world have established databases that contain information about the degradation of roads under real traffic and climate conditions. This field data shows a substantial variation in the degradation of a road's serviceability even for road sections that are considered identical with respect to construction, age, traffic, and climate. The existing facilities for Accelerated Pavement Testing (APT) allow for better monitoring of traffic and climate conditions, and some, like the Heavy Vehicle Simulator (HVS), even for experimental control of quantities like pavement temperature. Nevertheless, also APT data exhibits a fair degree of variation in e.g. the development of rut depth of neighboring sections with identical applied loading. Given the variability in both types of data, how can we compare the information from the LTPP program with evidence from APT? The presented work formulates a framework for the analysis of LTPP-data and APT-data, where the different environments are formally coupled by link functions. From the general model structure a number of questions are derived which have to be answered in order to develop a meaningful model that relates APT to LTPP-data. While APT is attractive due to the availability of results from designed experiments in relatively short periods of time, it derives its value from the belief that the performance of a pavement structure in the accelerated environment does contain valid information about its potential performance in the field environment. This belief seems to be shared by most engineers, but only very rarely attempts are made to explicitly describe the relationship of accelerated and non-accelerated environment. The here presented model based approach clarifies the involved issues and draws attention to the central questions that need engineering judgment.

PRESENTER'S QUESTIONS: I would like to receive comments, suggestions, and feedback from the meeting's attendees on the following matters:
1. What do we know about the relationship of accelerated and non-accelerated environment?
2. How much LTPP-data is available for road constructions that have been subject to APT?
3. How can a road agency be persuaded to fund APT for "old-fashioned" constructions with long history in the LTPP program?

PRESENTER'S STATEMENT: This work is still in progress, and has not been submitted for presentation or publication at another meeting.

TRAFFIC CHARACTERIZATION FOR MECHANISTIC PAVEMENT DESIGN

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ABSTRACT

The design of pavement structures is commonly done based on performance equations developed from experimental data. The AASHTO design method based on the AASHO Road Test is the most comprehensive and successful example. The main limitation of the empirical approach is that pavement performance estimation outside the original data range cannot be truthfully done. Due to this and other limitations, pavement engineers started to move towards mechanistic-empirical approaches. The most notorious and ambitious effort in this regard is Project NCHRP 1-37a: Development of the 2002 Guide for the Design of New and Rehabilitated Pavement Structures.

The mechanistic component enables estimation of pavement responses outside the original data range; whereas the empirical component correlates these responses to expected performance based on field or laboratory observations. Environmental, material and traffic characterization are taken into account more thoroughly than ever before. Traffic is no longer accounted for as ESALs but rather, the actual axle load distributions of each axle type (i.e. single, tandem, tridem and quad) are used in the analysis.

In an attempt to be prepared for the 2002 Guide, Texas Department of Transportation is conducting research to develop the necessary traffic data for levels 1, 2 and 3. These data consist of: monthly and daily variability, distribution per class, axle configuration, expected number of axles per truck type, etc.

This presentation will explain the approach that has been followed to address the above objective, describe some of the problems that have been encountered, present some practical solutions to by pass these problems, and show preliminary performance estimations and the effect of changing from ESALs to load spectra.

PRESENTER'S QUESTIONS: I would like to receive comments, suggestions, and feedback from the meeting's attendees on the following matters:

1. Bearing in mind that pavements are designed for 15 to 25 years or more and the logical limitations of forecasting environmental conditions, in your opinion, how accurate the traffic characterization for pavement design should be?
2. Although an axle load spectrum is the "way-to-go", we believe that the need for a summary statistic will remain. What is your opinion of ESAL? Have you looked into alternative statistics?
3. Is your state DOT, research institution, or company involved in any similar effort? Are you willing to interchange ideas and/or data?

PRESENTER'S STATEMENT: This work is still in progress, and has not been submitted for presentation or publication at another meeting.

VALIDATION AND IMPLEMENTATION OF A SELF-ITERATIVE SOFTWARE FOR 3D-FE DYNAMIC ANALYSIS OF FWD HISTORY DATA AND BACKCALCULATION OF PAVEMENT MODULUS VALUE

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ABSTRACT

Although falling weight deflectometer (FWD) device exerts an impact load on the surface of a pavement, it is a general practice to use peak FWD test results (load and deflections at several different points) in static backcalculation in order to estimate pavement layer moduli. Based on past researches and experiences, it is widely known that similar FWD peak loadings with different waveform will produce different peak FWD deflections. Furthermore, even though there is one-to-one correspondence between load and deflection waveforms, there is no one-to-one correspondence between peak load and peak deflection values. This is an indication that the use of only peak FWD test results in static backcalculation analysis may not correctly characterize the pavement structure.

It is, therefore, important to develop and use an efficient and reliable backcalculation method, which make use of time series FWD data. In dynamic backcalculation analysis, enormous amount of time is spent during forward analysis suggesting the need to make this part more efficiency. This paper introduces development of a fast and very efficient dynamic finite element backcalculation method, which utilizes Ritz vectors for matrix reduction. The following evaluations on the dynamic backcalculation method developed were performed in this research.
1. Compare its results with that from dynamic analysis using ANSYS, which is general-purpose FEM software in order to check its accuracy.
2. Perform static and dynamic backcalculation analyses using time series analytical deflections with different waveforms and compare the results.
3. Perform backcalculation analysis using real FWD data, and compare the results.
4. Vary seed values using random numbers and investigate their influences on the backcalculated results.

PRESENTER'S QUESTIONS: I would like to receive comments, suggestions, and feedback from the meeting's attendees on the following matters:
1. Is there any other method other than Ritz vectors for matrix reduction that can help to reduce computation time in the forward dynamic analysis?
2. Considering the level of FWD loading, is it necessary to perform nonlinear analysis for base and subgrade layers during dynamic backcalculation?
3. Are the effects of temperature variations with depth and viscoelasticity in the asphalt layer significant in dynamic backcalculation analysis?

PRESENTER'S STATEMENT: This work is still in progress, and has not been submitted for presentation or publication at another meeting.

A REVIEW OF DISTRESS DATA IN THE LTPP DATABASE

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ABSTRACT

Distress data has been collected from the Special Pavement Studies (SPS) experiments for more than 10 years. An analysis, using Datapave online (Release 15, January 2003), of rutting, fatigue cracking and transverse cracks on 683 asphalt SPS experiments (1,5,6 and 9) and rutting, transverse cracking, fatigue cracking, faulting and spalling on 244 concrete SPS sections (2,7) indicated that, overall, very little pavement distress has occurred. For example, 594 (87%) of the asphalt sections have rutting of less than 5 mm and fatigue cracking (all severities) of less than five per cent of the experimental section surface area. Five or less transverse cracks have been recorded on 390 sections (57%). On the concrete sections, 163 (67%) have no transverse cracks, 208 (85%) have no rutting and only one section has any fatigue cracking. Of the 77 sites where the experiments are located, 34 have associated traffic data in the database. An analysis of the construction data has also revealed some deviation from the experimental design in many of the sections in terms of the thickness of asphalt. This was attributed to different construction techniques and wearing course requirements amongst participating States. For example, on SPS-502 (2 inches of recycled asphalt on minimum surface preparation), mean overlay thicknesses vary between 1.3 inches and 4.2 inches over the 18 experiments.

A number of practitioners have questioned whether there will be sufficient distress data in the database to undertake pavement analysis research and have proposed that the data could be supplemented with data collected from Accelerated Pavement Testing experiments.

PRESENTER'S QUESTIONS: I would like to receive comments, suggestions, and feedback from the meeting's attendees on the following matters:
1. Is there sufficient data in the LTPP database for pavement analysis research such as the development of mechanistic design and pavement deterioration models?
2. Is sufficient data likely to be collected by the planned end of the experiment in 2009?
3. From a data analysis point-of-view, should the LTPP data be supplemented with APT data? If so, to what extent?
4. If yes, should testing be carried out on the actual SPS sections, or on purpose built "off-site" sections?
5. How will the variation from experimental design influence data analysis activities?

PRESENTER'S STATEMENT: This work is still in progress, and has not been submitted for presentation or publication at another meeting.

DISTRESS IDENTIFICATION AND ANALYSIS FOR THE FHWA-NPS ROAD INVENTORY PROGRAM

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ABSTRACT

The Federal Highway Administration (FHWA) conducts the Road Inventory Program (RIP) to accomplish pavement condition analysis on National Park Service (NPS) roads and parkways. Resulting RIP data has a direct nationwide effect on NPS road maintenance/construction budgets.

FHWA was charged with developing a methodology of distress identification and analysis that would generate a nationwide network analysis of NPS pavement condition. Originally, the LTPP Distress Identification Manual (DIM) was used as a guide for identification of asphalt distresses on NPS roads and parkways. Currently, the FHWA is developing a new DIM to meet specific RIP objectives. FHWA has also been challenged in formulating new index equations to adequately assign appropriate deducts for each distress, including roughness (IRI). An additional challenge is correlating the FHWA distresses to automated distress identification using digital photography.

This presentation provides an overview of the current FHWA-NPS methods for distress identification and analysis. FHWA believes these methods are appropriate for a network level analysis. However, these issues are still being addressed in FHWA's RIP Cycle 3 (ending Feb. 2004), and should be confirmed by the beginning of Cycle 4 (beginning fall 2004). Quality Assurance is an ongoing effort for FHWA for in-house quality checks as well as on contactors' data deliverables.

PRESENTERS' QUESTIONS: We would like to receive comments, suggestions, and feedback from the meeting's attendees on the following matters:
1. FHWA has developed a customized scheme of distress identification. What other schemes have been used by other agencies/firms and how successful are they?
2. FHWA believes they are within industry standards regarding formulas used for calculating distress deducts. We would like feedback on this.
3. What weight should roughness (IRI) and rutting play in rating pavement condition?
4. What are other agencies' experiences with QA of automated distress data? How do they define realistic QA criteria?

PRESENTERS' STATEMENT: This work is still in progress, and has not been submitted for presentation or publication at another meeting.

FORWARDCALCULATION TECHNIQUES & RESULTS

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ABSTRACT

Since the late nineteen-seventies, most efforts in terms of analyzing FWD load-deflection data have been in the area of "backcalculation". Today, many backcalculation programs exist, mainly utilizing linear-elastic subroutines where a given set of elastic moduli and layer thicknesses are used to calculate a set of deflections. These "calculated" deflections are then compared to the "measured" deflections recorded by the FWD in the field, and the moduli are then altered in a rigorous fashion until a nearly perfect match between the calculated and measured deflections is found.

In practice, the above-described backcalculation process appears to work quite well when the pavement structure is intact and relatively free of distresses, discontinuities, or other abnormalities—in other words, when the pavement structure consists of known, uniform layer thicknesses and homogeneous materials, and assuming the layer model used for backcalculation is similar to what is actually in-place. When this is not the case, the backcalculation process can result in the so-called compensating layer effect, due to an alternating over- and under-prediction of succeeding layer moduli from the bottom up. The compensating layer effect is typically due to the presence of a non-classic layered elastic pavement system, not an error in the backcalculation program per se.

In cases where backcalculation does not work well for any of the above reasons, valuable information nevertheless still exists. We can "see" the pavement's surface condition and we still have a valid FWD load-deflection basin to work with. For these (and other) reasons, new forwardcalculation techniques have been developed that are very useful in predicting both subgrade and bound surface course layer moduli. These forwardcalculation techniques were recently developed for use in an ongoing FHWA study to ascertain the validity, through screening, of the backcalculated layered elastic parameters in the LTPP database.

One of the forwardcalculation techniques was described and published some 20 years ago by G. Wiseman and J. Greenstein, in a 1983 paper entitled "Comparison of Methods of Determining Pavement Parameters from Deflection Bowl Measurements", published in the Proceedings of the 7th Asian Regional Conference on Soil Mechanics and Foundation Engineering. The method utilizes the "Hogg" model (based on a 1944 paper by A.H.A. Hogg), and it is used to determine the approximate subgrade modulus using the FWD's center deflection reading plus one of the offset deflection values. The offset distance where the deflection is approximately one-half of that under the center of the load plate was shown by Wiseman and Greenstein to be where the biases inherent to the simplified two-layer Hogg model compensate, such that the subgrade stiffness is neither over- nor under-estimated as oftentimes occurs with backcalculation. Both variations in pavement thickness and the ratio of the surface course stiffness to that of the subgrade are taken into account, since the distance to the point where the FWD deflection is around half of the deflection under the load plate is controlled by these factors.

In addition, a new and powerful model was developed to forwardcalculate surface course (or bound layer)

stiffnesses. This method has been termed the "AREA" approach. This approach was first introduced in 2002 as a result of NCHRP Study 20-50(09), "LTPP Data Analysis: Feasibility of Using FWD Deflection Data to Characterize Pavement Construction Quality". Through the currently ongoing FHWA study, the original equations from NCHRP 20-50(09) have now been updated and calibrated for both AC and PCC pavement surfaces. The AREA-based models utilize either three or four of the FWD's deflection readings, for AC and PCC pavements, respectively, using different algorithms for each pavement type. Only the composite modulus or stiffness of the pavement system "Eo" (from the center deflection), the AREA (using both a 12" and the standard 36" version of "AREA") and the bound (upper) layer thickness are used to calculate the effective stiffness, or modulus, of the bound upper layer(s) of pavement.

PRESENTERS' QUESTIONS: We would like to receive comments, suggestions, and feedback from the meeting's attendees on the following matters:

1. Has anyone <u>not</u> run into compensating layer effect problems when using traditional backcalculation to evaluate distressed AC or PCC pavement types, such that the moduli for most of layers in the pavement structure appear unreasonable (or worse), even if the RMS or "closure" constraints are met?
2. Would there be any interest in some agency providing a public domain spreadsheet- or database-programmed procedure, wherein the in-situ layered elastic properties of the subgrade and bound surface course layers <u>only</u> were calculated using your FWD load-deflection data?
3. Since the subgrade layer modulus as calculated by the Hogg (Case II) model are consistently lower, and in our view more realistic, than most backcalculation routines provide, how could one utilize such values in a pavement rehabilitation design procedure?

PRESENTERS' STATEMENT: This work is still in progress, and has not been submitted for presentation or publication at another TRB meeting, or any meeting where it was formally published. It was informally presented at the September 2003 FWD Users Group meeting in Wichita, Kansas.

FEASIBILITY USING STEREOVISION FOR PAVEMENT CONDITION SURVEY

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ABSTRACT

This presentation discusses results from the recently concluded research on the IDEA project N-88 "Automated Pavement Distress Survey through Stereovision". Using stereovision to establish 3D dimension of an object is not new and widely used in air and deep-space based remote sensing. In our research, dimensions in traditional stereovision techniques are reduced by a factor of 1,000 or more in our research. The goal is to reconstruct pavement surface in 3D domain at a resolution that is sufficient for engineering analysis in pavement management systems. These analyses include automated surveys of cracking, rutting, faulting, and other surface defects that exhibit abnormal vertical z distance. This IDEA project demonstrates that it is feasible to achieve the stated goal. The presentation will discuss necessary hardware technology of sensors and computing to support the implementation of the findings. Basic algorithms to establish 3D surfaces via two views are also introduced in the prerentation.

PRESENTER'S QUESTIONS: I would like to receive comments, suggestions, and feedback from the meeting's attendees on the following matters:

1. What is the minimum resolution in terms of millimeter for cracking, rutting, faulting and other surface defects in your agency?
2. In rutting survey, if a future stereovision system can provide comparable accuracy than laser based method, what are the potential disadvantages of stereovision that may prevent it from being used?
3. Are there other work in progress in other countries that uses similar technique of stereovision for pavement condition survey?

PRESENTER'S STATEMENT: This work is still in progress, and has not been submitted for presentation or publication at another meeting.